(SE). BERGSTEN, Anders [SE/SE]; Assistentvägen 254, S-977 52 Luleå (SE). KALLA, Thomas [SE/SE]; Rektorsgatan 12, S-972 42 Luleå (SE). KLITTBY, Nils-Åke [SE/SE]; Blidvägen 56. S-976 32 Luleå (SE). LEPPÄJÄRVI, Ann-Catrin [SE/SE]; Kårhusvägen 2:152, S-977 54 Luleå (SE). NILSSON, Peter [SE/SE]; Vägen Söderut, S-941 65 Luleå (SE). OLOFSSON, Sven-Rune [SE/SE]; Malmuddsvägen 9, S-972 45 Luleå (SE).

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(54) Title: PROCEDURE AND SYSTEM AT IP-NETWORK
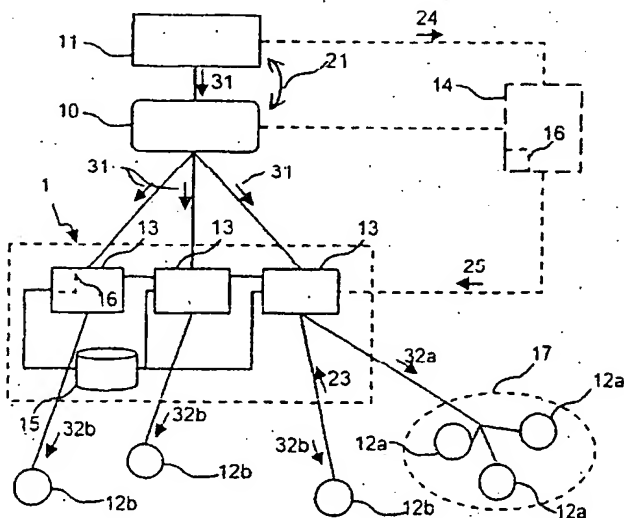
(57) Abstract: The invention describes how a distributor offers to a content provider facilities to offer, transmit and provide streaming media to an end consumer. The distributor provides the facility of caching the transmitted material, at which the distributor attends to that the end consumer receives the material adapted to the wishes and needs of the end consumer. Distribution of streaming media in an IP-network is made according to an agreed policy between content provider and distributor, at which the by the content provider by IP-multicast transmitted media is cached in a cache system before forwarding to end consumer. The caching is controlled by the policy that has been drawn up between the content provider and the distributor. The invention aims at removing problems of insufficient bandwidth in the IP-network between content provider and the end consumer by a procedure according to which streaming media is cached in a cache system according to a defined policy, after which said streaming media is forwarded to, and at request of him/her, an end consumer. After an initial transmission from the content provider by IP-multicast, said streaming media can be transmitted to a plurality of cache systems, including a plurality of media caches, without the load on the network becoming absurdly high. An end consumer after that can have said media forwarded from the media cache that is closest to his/her user terminal in the network. In addition, the end consumer can request a media quality that is adapted to the bandwidth that exists between said media cache and the user terminal.

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

PROCEDURE AND SYSTEM AT IP-NETWORK

TECHNICAL FIELD

5

The present invention relates to procedures and system
for policy-controlled distribution of streaming media in an
IP-network.

10   TECHNICAL BACKGROUND

The Internet of today often has insufficient
transmission capacity when one wants to distribute
multimedia material (streaming, or "direct played-back",
15   media) with large content of data, parallel to a large
number of end consumers, for instance by IP-multicast. The
reason for this is, among other things, that sufficient
transmission capacity for parallel transmissions is lacking
at the content providers. Other reasons can be an
20   insufficient bandwidth in the IP-network, or lack of means
for securing quality of delivery at the content provider
and/or the distributor.

Due to the poor transmission capacity on Internet, for
25   instance a video transmission, or the like, which is
distributed according to known technology for distribution
of streaming media, can be subject to unwanted
interruptions in the media flow. With the aim of reducing
the risk of interruption in the media flow, often a
30   temporary caching of the data flow from the content
provider is utilized. In practice the caching implies that
the transmission will be somewhat delayed, but in almost
all cases this delay is of minor importance to the end
consumer. Usually the caching is made locally in the end
35   consumer's terminal. If the content provider is located, in
the network, a long distance from the end consumer, for

instance if there are a large number of network nodes in
between, interruption in the media flow, however, can occur
if there in the IP-network is created a high load during
the transmission.

Another problem of the known technology is that the
transmission has to be adapted to a certain bandwidth. For
instance, the image or sound quality of the multimedia
material has to be reduced with the aim of adapting the
transmission to the one of the end users who has the lowest
available bandwidth, so the quality will be unnecessary low
for other end consumers. Alternatively, a higher quality of
the multimedia material is utilized, which requires a
larger bandwidth for the consumers, at which consequently
certain potential end consumers are excluded from the
transmission because of insufficient bandwidth.

Another problem at multimedia transmissions via IP-
multicast according to known technology is that late
joining end consumers have no possibility to receive the
whole transmission.

Yet another problem is how to economize on the
available network resources.

Summary of the invention

The aim of the present invention is to effect a
procedure that solves above problems. This object is
achieved by distribution of streaming media according to
the steps that are described in enclosed patent claim 1.

The invention also relates to a system for
distribution, according to above mentioned procedure, of
streaming media, which is drawn up according to the
enclosed patent claim 11.

The basis of the invention is an idea that a
distributor shall be able to offer to a content provider
improved possibilities to offer, transmit and provide
streaming media to an end consumer. A basic idea, and
5   important advantage, of the invention is that the
distributor provides the possibility of caching the
transmitted material, at which the distributor attends to
that the end consumer, at his/her request, will have this
material, forwarded in a way that is adapted to the end
10   consumers wishes and needs.

Distribution of streaming media in an IP-network is
consequently made, according the invention, according to an
agreed policy between a content provider and a distributor,
15   at which the by the content provider by IP-multicast
transmitted media is cached in a cache system before being
forwarded to the end consumer. How the caching is made is
controlled by the policy that is set up between the content
provider and the distributor.
20

From one aspect the present invention is aiming at
removing several of the problems that arise at insufficient
bandwidth in the IP-network between a content provider and
an end consumer. This is attained by a procedure according
25   to which streaming media, which initially is transmitted by
a content provider, is cached in a cache system according
to a defined policy, whereupon said streaming media is
forwarded to, and at request of, an end consumer. After an
initial transmission from the content provider by IP-
30   multicast, said streaming media can be transmitted to a
plurality of cache systems, and to a plurality in these
cache systems included media caches, without the load on
the network becoming absurdly high. An end consumer after
that can have said media from the media cache, which is
35   closest to his/her user terminal in the network, forwarded.

Furthermore, the end consumer can request a media
quality that is adapted to the bandwidth that exists
between said media cache and the user terminal.

5   From another aspect, the invention effects mechanisms
for securing of quality of delivery in the IP-network
between a content provider and an end consumer. According
to the invention, measuring functions are attained, which
decide which media caches that are best suited for caching
10   of streaming media in the light of the load of the IP-
network, the location of potential end consumers in the
network, the network location of end consumers who have
already made a request for forwarding of streaming media,
and in which media caches that different transmissions are
15   cached.

From another aspect, the present invention effects a
procedure that gives an end consumer increased
accessibility to streaming media that initially is
20   transmitted by a content provider. A procedure according to
the invention includes caching of streaming media in a
cache system, from where the end consumer can request
forwarding of said streaming media at just any point of
time.

25

From another aspect, the invention provides a
possibility to the end consumer to indicate which bandwidth
he/she has at disposal, at which the cache system adapts
forwarding according to specified bandwidth. For instance,
30   the image or sound quality of said streaming media can be
reduced to a level that is adapted to the available
bandwidth.

The present invention in also provides a plurality of
35   other possibilities and advantages, which will be evident
from the following description of some embodiments.

Different aims and characteristics also will be more
evident as the description of these embodiments are read.

Brief description of the drawing

In the following, description of a number of
embodiments of the invention is referred to the enclosed
drawing, which shows included units in a system according
to the present invention and data streams through the
system.

Description of preferred embodiments

With reference to Figure 1, initially a number of
preferred services, functions and procedures in a system
according to the present invention will be described by
means of examples. The invention, however, is in no way
limited to the exemplified services and functions.

Figure 1 shows a cache system 1, which includes a
number of media caches 13 and a host server 15. The system
is controlled by a management center 14, according to a
policy 21, which is set up between a content provider 11
and a distributor 10. End consumers 12 follow transmissions
from the content provider 11 under forwarding via a media
cache 13. Examples of how media can be distributed from the
content provider 11 to the end consumer 12 are given below.

The distributor 10 and the content provider 11 set up
a policy 21, which controls the rights and duties of
respective party. One policy, for instance, informs about
how long certain media material shall be cached in one by
the distributor 10 managed cache system 1, with which
bandwidths the material shall be available to the end
consumer 12, and with which degree of reliability the

Consumer 12 shall have possibility to access the material.
The content provider 11 starts at a certain point of time,
for instance at 9.00 p.m., transmission 31 from a server by
IP-multicast of streaming media, for instance a film. This
film can possibly be followed directly by one or more end
consumers 12. More important, however, is that the film is
followed, according to the invention, by the media caches
13 in the cache system 1, which cache at least parts of the
transmitted film 31, according to the with the content
provider set up policy 21, by which transmitted media is
transmitted from the content provider 11 to the cache
system 1.

Preferably, the whole film is stored in respective
media cache 13. Instead of following the film by IP-
multicast, the media caches 13 can receive an earlier
arranged transmission, so called "pre-streaming", of the
film from the content provider 11. This "pre-streaming"
can, for instance, have been performed at 8.30 p.m. in this
example. The end consumer 12 now has a plurality of options
when he/she shall watch the film. If "pre-streaming" has
been performed, the end consumer can choose to follow the
film, at the occasion of the content provider's direct
transmission, from one of the media caches 13, instead of
directly from the content provider 11. This can, for
instance, be to advantage if said media cache 13 is, in the
network, located much closer to the end consumer 12 than is
the case with the content provider's server 11. Planned
transmissions are, for instance, advertised via web pages,
or via direct e-mail, to interested end consumers 12. A
certain end consumer requests forwarding of a specific
transmission by transmitting a universally valid
identification (ID) to a multicast group (not shown). The
identification includes, for instance, the end consumer's
IP-address and a URN (Uniform Resource Name), which
describes the requested transmission. A media cache 13, in

which the requested material is cached, and which in
addition has capacity to forward this, responds with an
information about at which local IP-addresses the material
can be derived, or with an URL (Uniform Resource Locator)
which in its turn returns the local IP-addresses. These IP-
addresses can, for instance, be the own IP-number of the
media cache (at forwarding with unicast) or a multicast
group. At forwarding of previously transmitted material as
above, IP-multicast 32a is suitably utilized also for the
final transmission from the cache system 1 to the end
consumer 12.

End consumers who receive forwarded transmission from
the cache system 1 by multicast are in the figure indicated
by the general reference designation 12a. In the case that
the end consumer 12 should join the cache system 1, after
the regular transmission has started, there is a
possibility of fast-winding through the missed material
(the missed part of the film), whereupon the end consumer
12 joins the regular transmission. With the aim of
facilitating for the end consumer to scan through the part
of the material that he/she has missed, an indexing
function based on, for instance, a number of "key frames",
is preferably implemented. The fast-winding is preferably
transmitted directed to just this end consumer (unicast)
32b. End consumers who receive forwarded transmission from
the cache system by unicast are in the figure designated by
the general reference designation 12b.

In the cases when the connection to the content
provider's server is poor, for instance if the cache system
again and again has to ask for repetition 22 of lost data
packets, a "delayed direct transmission" can be utilized.
In this example, this "delayed direct transmission" can, as
a suggestion, start for instance 9.15 p.m., by which the
cache system 1 is given plenty of time for caching of the

from the content provider transmitted film. For economizing
with network resources, also the transmission of the cached
material is preferably made by IP-multicast.

5   After the transmission, the film should be accessible
in the cache system 1 for a further period of time. An end
consumer 12 then can on demand have the film forwarded from
the cache system 1 at just any point of time. Such
forwarding is suitably made by unicast 32b. In the cases
10 when a certain transmission, for instance an important news
feature, is expected to be requested by a large number of
end consumers, the forwarding is suitably somewhat delayed,
whereby a plurality of end consumers will have time to
transmit a request for watching the film. The requested
15 film then can be transmitted, by IP-multicast 32a, to these
end consumers within, for instance, 30 seconds.
Alternatively, the end consumer can have information about
when the next transmission from the cache system 1 will
occur.
20

The system can also be configured so that the end
consumer 12 himself/herself is content provider. He/she
consequently has possibility to store private material in
the cache system 1, for instance a holiday film, whereupon
25 the material can be forwarded to a multiple of other end
consumers, for instance the fellow travelers. Since a
plurality of end consumers are expected to want to study
the material, the transmission is suitably made by IP-
multicast 32a.
30

The end consumer 12 also has possibility to record a
certain transmission in order to watch it on a later
occasion. In this way, the end consumer can make sure that
the multimedia material (for instance a film or a radio
35 transmission) is in the cache system until final forwarding
is requested.

The cache system (i.e. the media caches) can forward a transmission with different coding formats and with different resolutions or sound quality, and in that way adapt the material to different types of terminals at the
5 end consumer 12.

With reference to Figure 1, now a preferred system according to the present invention will be described. The most important functions are effected by a number of media
10 caches 13, which are coordinated in a cache system 1, and at lest one management center 14. The management center can possibly be distributed in the system, which in the figure is indicated by showing it with dashed lines.

15 The media caches 13 listen for requests 23 about transmissions of cached media. An end consumer 12 transmits, for instance, a request that contains his/her IP-address and a URN that identifies the requested media material. If the called media cache contains the requested
20 material, and in addition is not too heavy loaded, said media cache responds to said request by forwarding the requested material to the end consumer.

The function 1 of the cache system against the content
25 provider 11 is, according to the set up policy 21 and the directions of the management center 14, to follow and store by the content provider 11 transmitted material, i.e. attend to that the media material is transmitted to the cache system 1. The storing is made either by following of
30 transmissions in progress, or by storing of a "pre-streaming" in progress. The management center listens for requests 24 from the content provider 11, about caching of streaming media. Such a request includes, for instance, among other things, information about which multicast
35 address that shall be used, when the transmission shall start, which multicast address that shall be used for

secure transmission, URN for the material, as well as a URL
for further information about the transmission. The
management center 14 also indicates which media caches 13
that shall be utilized, and initiates 25, if required,
moving of media material between the media caches 13. In
certain cases, the by the content provider 11 transmitted
media is stored in a host server 15, which primarily is
intended for longer caching. The host server 15
consequently is a special case of the media cache 13, for
storing of media during a longer period of time. The policy
21 controls how long, and in which formats, the material
shall be cached in the cache system 1. Said policy also
controls which media caches 13 and/or host servers 15 that
shall be engaged at each transmission. A policy can be
formulated as "All material from the news agency NN shall
be stored in at least 5 media caches for at least 180
minutes", or "After 3 requests for a certain material being
received by a certain media cache, and the requested
material not found cached in this media cache, the material
will be distributed there." The system also includes a
measuring function 16, which attends to requests that are
coming to the cache system 1 from the end consumers 12, and
analyses which of the media caches 13 that is best suited
for forwarding of the requested material. Which media cache
that is best suited is decided, for instance, on basis of
the content in respective media cache 13, the end
consumer's 12 location in the network in relation to
respective media cache 13, and the load on the network,
i.e. how much traffic that at the moment is passing through
the network between respective media cache 13 and said end
consumer 12. The coordination of the content etc. of the
media caches 13 is suitably made by means of SCSP (Server
Cache Synchronization Protocol). The necessary information
is collected by the measuring function 16 of the system,
whereupon the management center 14 decides which content
that shall be stored in respective media cache 13. Said

measuring function is preferably implemented distributed in
the network, for achieving a high efficiency. The measuring
function 16, for instance, can be implemented as a part of
the management center 14, or as a part of a media cache 13.
5   The measuring function also can attend to finding out the
location in the network of an end consumer 12, finding out
which media cache 13 that is closest a certain end
consumer, or finding out the media content of respective
media cache 13. The algorithm that is used in the system is
10 selected by the expert from case to case. A brief example
of a cache algorithm is:

1. Store the material at a central place in the
system, alternatively at a sufficiently large number of
15 places, to secure a reliable access to the material.

2. At a certain number of requests for the material
(for instance 3) from the same place, copy the material to
the media cache that in the network is closest to this
20 place. Said copying of the material is preferably made by
IP-multicast on an occasion when an end consumer requests
said material. The material then is stored, for instance,
by synchronous caching.

25 Final forwarding to the end consumer 12 is made either
by multicast 32a, or by unicast 32b. Below follow two
examples of how forwarding can be executed.

Multicast. The content provider has advertised a
30 transmission which an end consumer 12a in a multicast group
17 joins. This can, for instance, be the case at "pre-
streaming" or "delayed direct transmission". The advantages
for the end consumer 12a is, in this case, that the quality
of the transmission can be kept high, and that the
35 transmission can be shown at a, for the intended end
consumer, appropriate point of time. For instance, the

original transmission from the content provider 11, has taken place at a point of time when it was night at the end consumers 12a in the multicast group 17.

5   *Unicast*. The cached material can be accessed by an end consumer 12b at just any point of time. The end consumer transmits a request, which includes a URN, to a multicast group (not shown), which is listened in to by the media caches 13. This request can have a limited administrative
10   scope (controlled by for instance, "multicast administrative scope" or TTL), which is gradually extended until a media cache responds. The response includes the physical address of the material in form of a URL. A similar function can be used also at multicast, when
15   instead physical addresses are returned by SDP (Session Description Protocol). An efficient division of load can by that be effected in the network, thanks to the media caches, which are listening and responding to requests, and the measuring function. A media cache responds only if it
20   has the material in question stored, and if it has sufficient of resources to forward the material.

PATENT CLAIMS

1.   Procedure, for policy controlled distribution of
     streaming media in an IP-network, at which a
5   transmission (31) by IP-multicast of streaming media
     is distributed from a content provider (11) via a
     distributor (10) to an end consumer (12a, 12b), which
     procedure includes the steps:

10   -   to set up a policy (21) between the content
                    provider and the distributor, which policy
                    decides how the, by the content provider
                    transmitted, streaming media shall be
                    handled by the distributor,

15
               -    to configure, according to the set up
                    policy, a cache system (1) for caching of
                    said streaming media,

20   -   to transmit said streaming media to the
                    cache system, and

               -    to forward (32a, 32b) at least parts of said
                    streaming media from the cache system to the
25   end consumer.

2.   Procedure, as claimed in patent claim 1, where the
     step to configure a cache system further includes the step:

30   -   to detach a number of media caches (13) to
                    be part of said cache system, which media
                    caches are intended for caching of said
                    streaming media.

35   3.   Procedure as claimed in any of the patent claims 1 or
          2, where the step to transmit the by a content provider

transmitted media to the cache system further includes the steps:

- to wait for a request (24) from a content provider for distribution of streaming of media,

- to transmit, according to the set up policy and as response to a request from a content provider, said streaming media to one or more media caches (13) in the cache system (1), and

- to request repetition of transmission (22) of at least parts of said streaming media to a certain media cache if the transmission has failed.

4. Procedure, as claimed in patent claim 3, where repeated transmission of parts of said streaming media, as response to the step to request repetition of at least parts of said streaming media to a certain media cache is made directly from said content provider.

5. Procedure, as claimed in patent claim 3, where repetition of transmission of parts of said streaming media, as response to the step to request repetition of transmission of at least parts of said streaming media to a certain media cache is made from another, in the cache system included, media cache, to which the original transmission of said streaming media was successful.

6. Procedure, as claimed in any of the patent claims 1 to 5, where the step to forward said streaming media from the cache system to the end consumer, further includes the steps:

- to wait for a request (23) from an end consumer for forwarding of streaming media,

- to measure the load on the network between the
  end consumer and the cache system,

- to select, on basis of the end consumer's
  location in the network and the result of the
  step to measure the load on the network, the
  media cache in the cache system that is best
  suited for forwarding of said streaming media to
  said end consumer, and

- to forward, as response to a request from an end
  consumer, said streaming media to the end
  consumer from the selected media cache.

Procedure, as claimed in patent claim 6, which further
includes the steps:

- to find out, on basis of the end consumer's
  location in the network and the measured load on
  the network, that there is at least one media
  cache that is better suited for forwarding of the
  in the cache system cached media to the end
  consumer than the media caches which for the time
  being are utilized, and

- that at least partly transmit in the cache system
  cached media to at least one media cache that is
  better suited for forwarding of the in the cache
  system cached media to the end consumer, than the
  media caches that are utilized for the time
  being.

8. Procedure, as claimed in any of the patent claims
above, where the set up of said policy includes deciding at
least one/any of the following:

- in which data formats said streaming media shall
  be accessible to the end consumer,

- in which media caches said streaming media shall
  be accessible to the end consumer,

- how long time said streaming media shall be
  cached in the cache system, and by that be
  accessible to the end consumer,

- by what degree of reliability said streaming
  media shall be accessible by the end consumer.

9.   Procedure, as claimed in any of the patent claims
above, where the step to forward said streaming media to
the end consumer at least partly is made at request of said
end consumer, by means of fast-winding.

10.   Procedure, as claimed in patent claim 9, where the
cached media material includes a number of key frames, for
facilitating the end consumer's request for fast-winding,
at which the end consumer in a simple way finds requested
part of the media stream.

11.   System for policy controlled distribution of streaming
media in an IP-network that includes

- a cache system (1), which is arranged to receive
  and cache streaming media (31) that is
  transmitted by IP-multicast from a content
  provider (11), and to forward, at request of an
  end consumer (12a, 12b), said streaming media to
  said end consumer, and

- a management center (14), which is arranged to
  configure the cache system (1) according to one

between the content provider (11) and a
distributor (10) set up policy (21).

12.   System, as claimed in patent claim 11, in which the
cache system (1) includes a number of media caches (13),
which are intended for caching of streaming media.

13.   System, as claimed in any of the patent claims 11 or
12, further including devices (16) for finding out the
location in the network of an end consumer who has
requested forwarding of streaming media.

14.   System, as claimed in patent claim 13, further
including devices (16) for finding out which in the cache
system (1) included media cache (13) that in the network is
closest to the end consumer who has requested forwarding of
streaming media.

15.   System, as claimed in any of the patent claims 11 to
14, further including devices (16) for finding out the
media content in respective media cache.

1/1
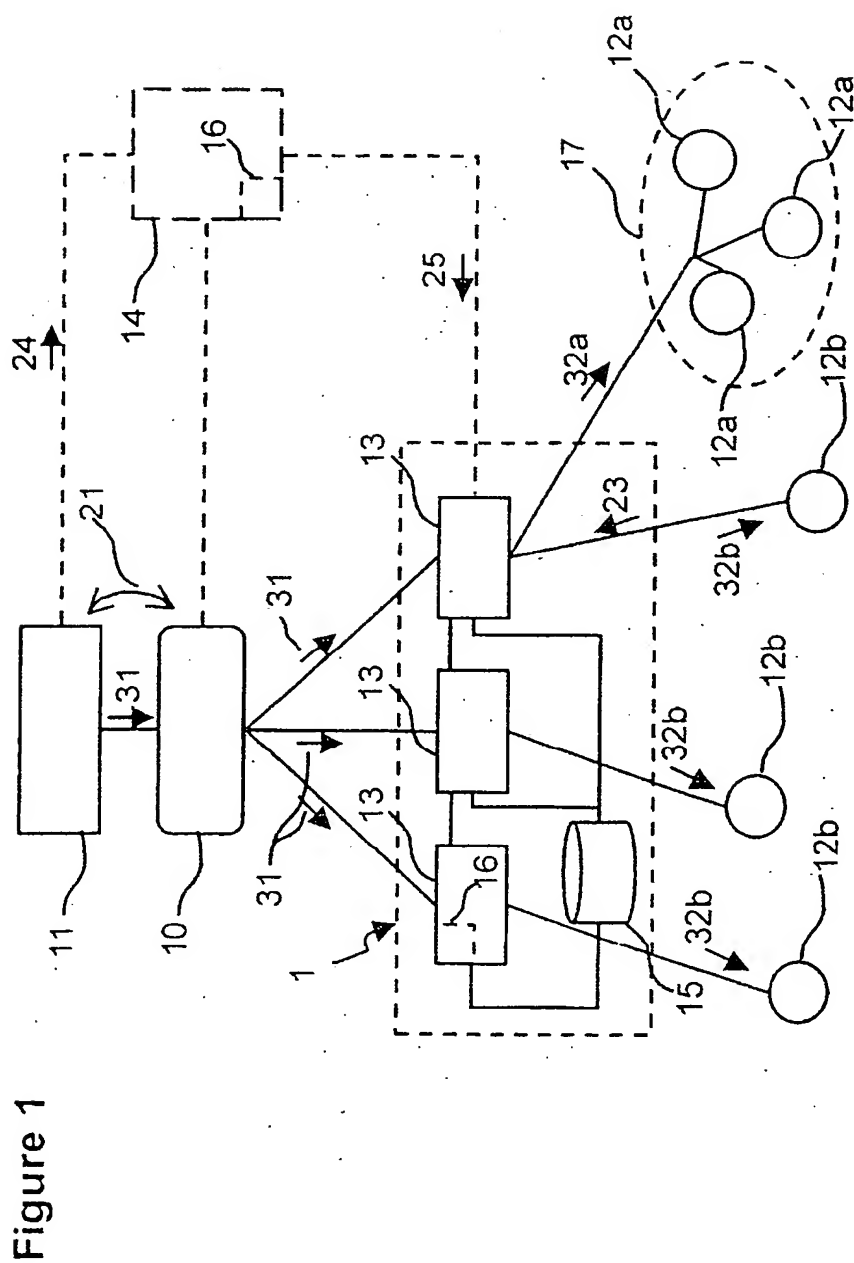
Figure 1

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 12/18, H04L 12/56, H04Q 11/00, H04N 7/173
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04L, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9917227 A1 (INTERNATIONAL BUSINESS MACHINES CORPORATION), 8 April 1999 (08.04.99), page 19, line 10 - line 40	1-15
PX	S.-H.G. CHAN ET AL:"Threshold-Based Admission Policies for Video Services"; in: Global Telecommunications Conference, 1999. Globecom, On page(s) 2076 - 2080, vol.4, 5-9 Dec.1999; retrieved from the Internet, IEEE, retrieved on 29 September 2000	1-15
A	US 5758085 A (JACK KOUOHERIS ET AL), 26 May 1998 (26.05.98), column 3, line 27 - line 63, abstract	1-15

[X] Further documents are listed in the continuation of Box C.   [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
2 October 2000	1 8 -10- 2000

Name and mailing address of the ISA/	Authorized officer
Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Kristoffer Ogebjer/LR Telephone No. + 46 8 782 25 00

C (Continuation).   DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9824208 A2 (INMEDIA INVESTMENT LIMITED), 4 June 1998 (04.06.98), page 3, line 3 - line 23; page 5, line 12 - line 15; page 11, line 26 - page 15, line 3	1-15
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A	US 5592626 A (CHRISTOS PAPADIMITRIOU ET AL), 7 January 1997 (07.01.97), column 5, line 10 - column 6, line 17	1-15
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A	US 5737747 A (NATAN VISHLITZKY ET AL), 7 April 1998 (07.04.98), column 22, line 10 - column 23, line 19	1-15
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International application No.

PCT/SE 00/01408

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9917227	A1	08/04/99	EP	1018085 A	12/07/00
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